R-TECH™ BULLETIN
Emerging Technologies in Emergency Response and Public Safety

Homeland Security
Science and Technology

Q&A with R-Tech: First Responder Working Group

February 22, 2011

The Department of Homeland Security Science and Technology Directorate (DHS S&T) established the First Responder Research, Development, Test, and Evaluation Working Group (FRWG) in 2009 to advise DHS S&T about the technology requirements of the nation's first responders. The FRWG is part of DHS S&T's newest Integrated Product Team (IPT), which identifies and fills these technology needs. The First Responder IPT creates a partnership and a sustainable feedback loop between DHS S&T and the first responder community.

Patty Dukes
Chief of Emergency Medical Services
City and County of Honolulu, Hawaii

Work Experience: 27 years working in EMS in Honolulu

Service: Has taught Emergency Medical Dispatch courses since 1994, serves on the National Academy of Emergency Dispatch College of Fellows, and is a member of the Curriculum Council for the National Academy for Emergency Medical Dispatch.

Expertise: EMS Administration, emergency medical dispatching, and all-encompassing customer service.

Q: The First Responder IPT is now underway. How do you feel about the process so far?

A: I believe the process is working very well. On the emergency medical services side, I'm proud of some of the innovations we've proposed. The final products are believed to have benefits for all emergency responders. The ideas include changes in the way responder credentialing is handled at emergency scenes, and Honolulu is a test site for that project.

The [FRWG] EMS group came up with a plan to have manufacturing and safety standards for the patient compartments in an ambulance. *[Editor's Note: DHS S&T has partnered with the National Institute for Occupational Safety and Health, the National Institute of Standards and Technology, and the National Fire Protection Association to develop comprehensive safety standards for the entire ambulance from construction to ergonomic safety.]* Basically, an ambulance is a truck chassis with a box put on the back, and the box is where we put the patient and our paramedics. It's really not terribly safe. Emergency vehicle collisions still pose the greatest risk to all of our agencies, and that includes fire, EMS, and law enforcement. And, in particular, the ambulance box patient compartment is not all that sturdy. We're looking for a way to make the construction far safer for everyone involved.

Each first responder discipline is presenting its topics and issues, and what we're finding is [these issues] exist for all. It's amazing that so many minds can come up with the same goals. We believed the challenges were unique to our respective agencies. We discover there are similar issues around the United States.

Q: As a First Responder Working Group member, how do you go about assessing what the most urgent research and development needs are?

A: We brainstorm and come up with a list of challenges or projects. The ideas are presented to the entire First Responder Working Group. We whittle through the list, coming up with a consensus. It is a very, very cooperative and synergetic group.

First Responder Working Group (continued)

Q: How does the FRWG collect input from the first responder community?

A: A diverse group of first responders from different communities, experiences, and backgrounds were selected to be on this committee to represent the interests of the broader first responder community. We capture the ideas and go back to our agencies and associations to see if there was something we missed or a project that should be a higher or lower priority.

Q: In your opinion, what have been the most significant technology advances in your discipline in recent years?

A: There are a couple of things I have been excited about: the technology with electrocardiograms (EKGs), portable EKG machines, and the ability for Honolulu EMS to transmit 12-lead EKGs directly to a cardiologist's personal digital assistant. The paramedics transmit those particular EKGs [that show a person is likely having a heart attack] to the emergency room and the cardiologist. As the ambulance is transporting the patient having a heart attack, the cardiologist can decide if it's necessary to stand up the catheterization lab before the ambulance arrives. [That decision can] reduce the time required to perform an invasive procedure to minimize the damage caused by a heart attack.

Q: How have technology advances changed the way you do your job?

A: As a paramedic who has been doing this for a few years, I've seen tremendous changes from what we did 27 years ago. Up until recently, we were dependent upon our clinical skills to make the right decisions. We were looking at signs, symptoms, and things that people say or present with, and we would treat accordingly. Now we have a lot of diagnostic tools at our proposal, so we've got more precise measurements of patient's conditions that we're able to respond to. Clinical skills with adjunctive modern technology has made [treatment] so much more exact.

Q: What personal technology successes, best practices, or collaborative projects can you share that would benefit others in your discipline?

A: In my agency in 2006, we came up with the idea to have the communications center's various computer systems be able to collect data and automatically send data out to the ambulances that would be accurate. It wasn't anything that hadn't been done [elsewhere], but it was new for Honolulu. We had a very old [UHF] radio system, and the challenge was that our radio system didn't "speak the same language" as the new computer technology. That was our biggest challenge, getting them to talk to each other.

What we have now is called Wireless Enhanced 911. A 9-1-1 caller's location information pops up. It gives us an address, a phone number, a cross street, what police section it is in, what ambulance would most likely respond, and what fire trucks would most likely respond. [Before this system,] we had all that information coming in, but our dispatchers still had to voice dispatch the ambulances [by radio]. We had three or four different kinds of computer programs, and they were not communicating with one another. The challenge from our end was to connect these systems to send one message to the ambulances that gave them all this data from these three different systems.

Q: What are the high-priority threats you are preparing for in your region, and how is new technology playing a role?

A: Honolulu is going to be the host city for the Asia-Pacific Economic Cooperation Leaders Meeting in November 2011, and it's considered a national security event. [The city will be] offering a class to teach us about what risk assessment is and the tools they use. That's going to help us decide what we need to look for and what we need to do.

Earlier risk assessments showed us that EMS needs to take special precautions during [events like the upcoming meeting] because terrorists like to use ambulances of

First Responder Working Group (continued)

their weapons of choice. It gets them access to any location. As a result, Honolulu EMS has heightened awareness. Paramedics arriving at a scene must keep the engine running, and take the key fob off and lock the ambulance so the vehicle doesn't get stolen or tampered with while we are taking care of a patient.

Q: DHS S&T is focusing on near-term needs first, but also is working on solutions that will take longer to develop. When you consider the future – at least 10 years down the road – can you describe the "Holy Grail" of technologies that would solve some of your biggest problems?

A: Communication is always an issue. If there's no power, there's no communication. When power goes out on our island, we're out of luck until they can restore service and sometimes it takes a day or two. I'm looking to be able to communicate without being dependent upon electricity. Yes, we have generators, but they don't always power the towers and repeaters. First responders remain without a communications system. It's always been a challenge, and it will continue to be. If everything goes down, some of our interoperability systems depend on cellular service, [which is reliant on towers powered by electricity]. Satellite is still a very expensive alternative. If that's the only technology that works, we'll use it, but I'd like to see that be developed to be a little more reasonably priced and accessible for agencies.

Q: Is there any new technology that you are looking to learn more about or can't wait to get your hands on?

A: An FRWG member came up with the idea for a system in cars to turn down the radio and alert the drivers [with an audio message] when an emergency vehicle is approaching. That notification system is something I'm anxious for, and I believe others are, too. I think it's a big safety issue. We have responding vehicles, and people don't hear them. That's kind of my pet project for a number of reasons, the least of which would be the siren complaints [from Honolulu residents]. The priority would be safety for the community, the motoring public, and the first responders responding to and taking the sick or injured to the hospitals. Fire trucks would be able to respond to scenes in a safer and a more timely fashion.